ABSTRACT

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Title : Identifying the Role of Bone Morphogenetic Protein Signaling in Regulating Melanogenesis, Melanin Transfer, and Migration of Melanocytes in the Melanocyte Hair Follicle Stem Cell Niche

Vitiligo, a skin disorder characterized by the appearance of white patches in the skin, which arises from the lack of melanin, is considered as one of the most common dermatological disorder. It affects at least 1% of the world's population. The exact main cause of the disease remains elusive; it is said that the lack of pigment arises from progressive destruction of melanocytes by the immune cells. Current treatment focuses on inducing follicular repigmentation in vitiligo lesions through the utilization of phototherapy. However, this mode of treatment can be time-consuming and ineffective since it requires continuous exposure to UV and may lead to undesirable side effects. Recently, it has been reported that BMP signaling plays an implicating role in regulating the activities of MeSC in the hair follicle compartment, which is responsible for maintaining them quiescent. To study the functional role of BMP signaling in regulating melanocyte functions, both *in vitro* and *in vivo* approach were utilized. Our *in vitro* data showed that BMP4 significantly downregulates melanocytes functions which includes melanogenesis, melanin transfer, and melanocytes migration. Moreover, upon downregulation of BMP4 expression using its inhibitor, Noggin, an increased in melanocyte functions was observed. Furthermore, our *in vivo* data also demonstrated similar outcomes where an increase in melanocyte functions were observed following cKO of BMP4. The following data reveal the potential role of BMP4 in regulating melanocyte functions, and thus making it a potential target to induce follicular repigmentation in vitiligo.